



FAA-E-2281a
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SUPERSEDING
FAA-E-2281, 1/17/67

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

SPECIFICATION

ANTENNA, VHF, COAXIAL

1. SCOPE

1.1 Scope.- This specification describes a broadband VHF coaxial antenna designed for attachment to a supporting pipe and to match a 50 ohm, type RG-213/U coaxial cable. The antenna operates within a frequency range of 118 to 144 MHz, inclusive.

2.

2. APPLICABLE DOCUMENTS

2.1 FAA specifications.- The following FAA specifications, of the issues specified in the invitation for bids or request for proposals, form a part of this specification, and are applicable to the extent specified herein:

FAA-D-1272 Instruction Booklets, Electronic Equipment

FAA-G-2100/1 Electronic Equipment, General Requirements
Part 1, Requirements for All Equipments

3. REQUIREMENTS

3.1 Equipment to be furnished by the contractor.-Each antenna furnished by the contractor shall be complete in accordance with all specification requirements, including the input cable connector Part 12, and the straight coupling Part 17, specified on Fig. 1.

3.1.1 Instruction booklets.- Instruction booklets shall be furnished and shall be in accordance with Specification FAA-D-1272, except that the following sections may be omitted (also see 3.4.1 hereof): The quantities to be furnished shall be as called for in the contract schedule.

Section 3: Operation

Section 7: Circuit diagrams

3.2 Applicability of FAA-G-2100/1

3.2.1 Supplement-1 coverage.- Paragraph 1-2.1 of FAA-G-2100/1 (covering Supplement-1) shall apply only to designate applicable issues of MIL-C-71, Handbook H28, and B21216.

3.2.2 Part 1 coverage.- The following paragraphs of FAA-G-2100/1 shall apply, with limitations shown:

- 1-2
- 1-3.2.2 to 1-3.2.5
- 1-3.2.11
- 1-3.2.18
- 1.3.2.23 (Environment III)
- 1-3.8.1
- 1-3.8.4 to 1-3.8.8
- 1-3.13 to 1-3.13.3
- 1-3.14.1.1
- 1-3.16.3.3 (type "N" connectors only)
- 1-3.16.13.1
- 1-3.16.13.6
- 1-4.1 to 1-4.3.1.2
- 1-4.3.2 (delete "Rating tests" and "Other general specification tests")
- 1-4.3.3 to 1-4.3.4
- 1-4.4 to 1-4.7
- 1-4.10 to 1-5.1

3.3 Antenna impedance.- The design-center impedance of the antenna over the specified frequency range shall be 50 ohms.

3.4 Standing Wave Ratio.- The SWR of the antenna at each frequency in the range from 118.0 to 136.0 MHz shall be less than 2.0 and from 136.1 to 144.0 MHz shall be less than 3.0. This requirement shall apply after immersion and drying per 4.2 hereof.

3.4.1 Voltage SWR Curve.- A typical graph of voltage SWR versus frequency shall be included in the instruction booklet. The curve shall show the spread of SWR as obtained from measurements on not less than 3 production antennas.

3.5 Power gain.- The power gain shall be not less than 1.5 dB better than an isotropic radiator.

3.6 Leakage current.- The leakage current shall not exceed 100 uA at 500 V after immersion and drying per 4.2 hereof:

3.7 Construction.- The antenna shall be constructed in accordance with Fig. 1. The dimensions are shown as nominal and may be altered to meet the specified electrical characteristics. However, the overall length of the antenna and aluminum mounting pipe (measuring point B to the bottom end of part 13 on the referenced drawing) shall not exceed $5\frac{1}{2}$ feet. The insulator cap (Part 4) outside surface shape can be modified if necessary to meet the requirements of FAA-G-2100/1 paragraph 1-3.2.23 (Environment III). Any proposed change shall be submitted to the contracting officer for approval. The cable connectors shall be type "N" with captivated pins.

3.7.1 Upper element.- The upper element shall be constructed of solid round aluminum rod. The base shall be drilled and tapped to facilitate a $\frac{3}{8}$ inch standard Heli-Coil thread, or equal. The Heli-Coil thread, or equal, shall be stainless steel A.I.S.I., type number 303 as a minimum requirement.

3.7.2 Mounting pipe.- The bottom end of the aluminum mounting pipe, part 13 on referenced drawing, shall be threaded with standard $1\text{-}1\frac{1}{4}$ inch pipe thread, extending along the mounting pipe at least $1\text{-}1\frac{1}{2}$ inches. Two grooves shall be turned above the threads to facilitate seating of the clamping rings (Part 16) and shall have a depth no greater than $\frac{1}{32}$ inch.

3.7.3 Supporting flange.- The supporting flange (Part 9) shall be constructed in accordance with the dimensions shown on referenced drawing. The supporting flange shall be TIG welded to the aluminum mounting pipe (Part 13) and the aluminum skirt (Part 14).

3.7.4 Insulation.- The material used for the insulator cap, Part 4, and the insulator ring, Part 15 on the referenced drawing, shall be Plumb Chemical Co., Fibrecore No. 3000, or equal.

3.7.4.1 Insulating cap compound.- The insulator cap shall be filled with a silicone compound, Dow-Corning DC-4, or equal, prior to testing and shipping.

3.7.5 Assembly.- In the final assembly, the stainless steel plate (Part 8 of referenced drawing) shall be secured to the insulator cap (Part 4) by means of 6-32 screws.

3.7.6 Electrical connections.- An electrical connection shall be made between the lug of Part 6 and Part 11 before assembly of their associated components.

3.7.7 Nameplate.- The nameplate furnished in accordance with FAA-G-2100/1 shall be mounted on (Part 13) shown on Figure 1. The title shall be ANTENNA, COAXIAL 118-144 MHz.

3.8 Materials.- All aluminum shall be 6061 T6 alloy or better (not applicable to nameplate). All steel shall be 303 stainless steel as a minimum. All washers shall be stainless steel.

3.9 Antenna finish.- All visible metal parts shall be alkali etched and completely coated with a suitable primer, baked on, followed by a complete coat of light gray enamel, baked on. The contractor shall furnish certification that the primer and finish coat of paint is suitable for outdoor use over a temperature range from -50°C to 70°C and relative humidity of 100 percent.

4. QUALITY ASSURANCE PROVISIONS

4.1 General.- See FAA-G-2100/1.

4.2 Design qualification tests.- The following design qualification tests shall be performed:

Immerse the assembled antenna in water for 24 hours. Remove and allow to stand at room ambient conditions for not more than one hour. Apply 500 V between the center and outer conductor of the connector, Part 11. The leakage current shall not exceed the value specified in 3.6. Then check the voltage SWR at 118, 123, 128, 133, 136 and 144 MHz for compliance with 3.5. For the SWR test, the antenna shall be mounted on a metal pipe so that the bottom of Part 13 (called "base level") is not less than 10 feet above ground level. The hemispherical area surrounding the antenna under test shall be clear of any metallic obstructions other than necessary test equipment for a radius of not less than 40 feet from base level. Test equipment and personnel shall be located below the base level.

4.3 Type tests.- The following type tests shall be performed:

Repeat the immersion, drying, and SWR procedure given in 4.2 accomplish measurement of SWR at the following frequencies: 118, 123, 128, 133, 136, 144 MHz.

Power Gain (checks at above increments) 3.5.

4.4 Production inspection.- Each antenna shall be inspected for conformance to the applicable drawing and all mechanical and finish requirements of this specification. Each antenna shall be given the leakage test 3.6 (without water immersion).

5. PREPARATION FOR DELIVERY

5.1 Assembly for shipping.- Partially disassemble the finished antenna and invert the upper assembly consisting of the upper element and insulator cap assembly, and insert into the mast. Secure the two elements together by means of the bolts used in normal assembly.

5.2 Packing and marking.- See FAA-G-2100/1.

5.2.1 Individual packing.- Where two or more units are packed in a common shipping container, each unit with its accessories shall be packed for domestic shipment and marked so that it can be identified and reshipped individually without repacking.

6. NOTES

6.1 None

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For Fig. 1, see page 6.

NOTE:
1. ALL ALUMINUM SHALL BE 6061 T6 OR BETTER.

FIGURE 1

